

Agriculture & Food Vulnerability Assessment

Training Program - CARVER + Shock scoring

Individual Facilities

UR | College of Veterinary Medicine

Criticality: A target is critical when introduction of threat agents into food at this location would have significant health or economic impact. Example metrics are:

| Criticality Criteria - Use this scale to assess: An individual food processing facility | Scale | Criticality Criteria - Use this scale to assess: An individual crop or animal agriculture facility | Scale |
|---|---------------|--|---------------|
| Loss of over 10,000 lives OR loss of > 90 % of the total economic value. | 9 - 10 | Loss of > 90 % of animal lives or total economic value. | 9 - 10 |
| Loss of life is between 1,000 - 10,000 OR loss of between 61% and 90 % of the total economic value. | 7 - 8 | Loss of 61% - 90 % of animal lives or total economic value. | 7 - 8 |
| Loss of life between 100 and 1000 OR loss of between 31% and 60% of the total economic value. | 5 - 6 | Loss of 31% - 60% of animal lives or total economic value. | 5 - 6 |
| Loss of life less than 100 OR loss of between 10% and 30% of the total economic value. | 3 - 4 | Loss of 10% - 30% of animal lives or total economic value. | 3 - 4 |
| No loss of life OR loss of < 10% of the total economic value. | 1 - 2 | Loss of < 10% of animal lives or total economic value. | 1 - 2 |

Accessibility: A target is accessible when an attacker can reach the target to conduct the attack and egress the target undetected. Accessibility is the openness of the target to the threat. This measure is independent of the probability of successful introduction of threat agents. Example metrics are:

| Accessibility Criteria | Scale |
|--|---------------|
| Easily Accessible (e.g., target is outside building and no perimeter fence). Limited physical or human barriers or observation. Attacker has relatively unlimited access to the target. Attack can be carried out using medium or large volumes of contaminant without undue concern of detection. Multiple sources of information concerning the facility and the target are easily available. | 9 - 10 |
| Accessible (e.g., target is inside building, but in unsecured part of facility). Human observation and physical barriers limited. Attacker has access to the target for an hour or less. Attack can be carried out with moderate to large volumes of contaminant, but requires the use of stealth. Only limited specific information is available on the facility and the target. | 7 - 8 |
| Partially Accessible (e.g. inside building, but in a relatively unsecured, but busy, part of facility). Under constant possible human observation. Some physical barriers may be present. Contaminant must be disguised, and time limitations are significant. Only general, non-specific information is available on the facility and the target. | 5 - 6 |
| Hardly Accessible (e.g., inside building in a secured part of facility). Human observation and physical barriers with an established means of detection. Access generally restricted to operators or authorized persons. Contaminant must be disguised and time limitations are extreme. Limited general information available on the facility and the target. | 3 - 4 |
| Not Accessible Physical barriers, alarms, and human observation. Defined means of intervention in place. Attacker can access target for less than 5 minutes with all equipment carried in pockets. No useful publicly available information concerning the target. | 1 - 2 |

Recuperability: A target's recuperability is measured in the time it will take for the specific facility to recover productivity. Example metrics are:

| Recuperability Criteria | Scale |
|--------------------------------|---------------|
| > 1 year | 9 - 10 |
| 6 months to 1 year | 7 - 8 |
| 3-6 months | 5 - 6 |
| 1-3 months | 3 - 4 |
| < 1 month | 1 - 2 |

Vulnerability: A measure of the ease with which threat agents can be introduced in quantities sufficient to achieve the attacker's purpose once the target has been reached. Vulnerability is determined both by the characteristics of the target (e.g., ease of introducing agents, ability to uniformly mix agents into target) and the characteristics of the surrounding environment (ability to work unobserved, time available for introduction of agents). It is also important to consider what interventions are already in place that might thwart an attack. Example metrics are:

| Vulnerability Criteria | Scale |
|--|--------|
| Target characteristics allow for easy introduction of sufficient agents to achieve aim. | 9 – 10 |
| Target characteristics almost always allow for introduction of sufficient agents to achieve aim. | 7 – 8 |
| Target characteristics allow 30 to 60% probability that sufficient agents can be added to achieve aim. | 5 – 6 |
| Target characteristics allow moderate probability (10 to 30 %) that sufficient agents can be added to achieve aim. | 3 – 4 |
| Target characteristics allow low probability (less than 10%) sufficient agents can be added to achieve aim. | 1 – 2 |

Effect: Effect is a measure of the percentage of system productivity damaged by an attack at a single facility. Thus, effect is inversely related to the total number of facilities producing the same product. Example metrics are:

| Effect Criteria | Scale |
|---|--------|
| Greater than 50% of the system's production impacted | 9 – 10 |
| 25-50% of the system's production impacted | 7 – 8 |
| 10-25% of the system's production impacted | 5 – 6 |
| 1-10% of the system's production impacted | 3 – 4 |
| Less than 1% of system's production impacted | 1 – 2 |

Recognizability: A target's recognizability is the degree to which it can be identified by an attacker without confusion with other targets or components. Example metrics are:

| Recognizability Criteria | Scale |
|--|--------|
| The target is clearly recognizable and requires little or no training for recognition | 9 – 10 |
| The target is easily recognizable and requires only a small amount of training for recognition | 7 – 8 |
| The target is difficult to recognize or might be confused with other targets or target components and requires some training for recognition | 5 – 6 |
| The target is difficult to recognize. It is easily confused with other targets or components and requires extensive training for recognition | 3 – 4 |
| The target cannot be recognized under any conditions, except by experts. | 1 – 2 |

Shock: Shock is the final attribute considered in the methodology. Shock is the combined measure of the health, psychological, and collateral national economic impacts of a successful attack on the target system. Shock is considered on a national level. The psychological impact will be increased if there are a large number of deaths or the target has historical, cultural, religious or other symbolic significance. Mass casualties are not required to achieve widespread economic loss or psychological damage. Collateral economic damage includes such items as decreased national economic activity, increased unemployment in collateral industries, etc. Psychological impact will be increased if victims are members of sensitive subpopulations such as children or the elderly.

| Shock | Scale |
|--|-------|
| Target has major historical, cultural, religious, or other symbolic importance. Loss of over 10,000 lives. Major impact on sensitive subpopulations, e.g., children or elderly. National economic impact more than \$100 billion. | 9-10 |
| Target has high historical, cultural, religious, or other symbolic importance. Loss of between 1,000 and 10,000 lives. Significant impact on sensitive subpopulations, e.g., children or elderly. National economic impact between \$10 and \$100 billion. | 7-8 |
| Target has moderate historical, cultural, religious, or other symbolic importance. Loss of life between 100 and 1,000 . Moderate impact on sensitive subpopulations, e.g., children or elderly. National economic impact between \$1 and \$10 billion. | 5-6 |
| Target has little historical, cultural, religious, or other symbolic importance. Loss of life less than 100 . Small impact on sensitive subpopulations, e.g., children or elderly. National economic impact between \$100 million and \$1 billion. | 3-4 |
| Target has no historical, cultural, religious, or other symbolic importance. Loss of life less than 10 . No impact on sensitive subpopulations, e.g., children or elderly. National economic impact less than \$100 million. | 1-2 |